

## CLAIMS

1. A chimaeric virus particle derived from a plant virus having a coat protein with a beta barrel structure and modified by insertion of an immunogenically active peptide of a tumour-associated mucin at an immunogenically effective site in the coat protein.
- 5 2. A chimaeric virus particle according to Claim 1, in which the insert is present in a loop connecting beta sheets.
3. A chimaeric virus particle according to Claim 1, in which the insert is present in the region of the C-terminus of a coat protein.
- 10 4. A chimaeric virus particle according to Claim 3, in which the insert is present at a point within 30 amino acids, preferably within 15 amino acids, of the C-terminus.
- Sub A1 > 5. A chimaeric virus particle according to any of Claims 1 to 4, in which the tumour-associated mucin is PEM.
- 15 6. A chimaeric virus particle according to Claim 5, in which the insert is a peptide derived from the 20 amino acid repeat of the extracellular portion of the MUC1 transmembrane molecule.
7. A chimaeric virus particle according to Claim 6, in which the peptide is a 16-mer, preferably SEQ ID 6, or a 23-mer peptide, preferably SEQ ID 7.
- Sub A2 > 8. A chimaeric virus particle according to any of the preceding claims, in which the plant virus is a comovirus.
- 20 9. A chimaeric virus particle according to Claim 8, in which the plant virus is cowpea mosaic virus.
10. A chimaeric virus particle according to Claim 9, in which the insert is present in the S protein of the virus.
- 25 Sub A3 > 11. A method for producing a chimaeric virus particle according to any of Claims 1 to 10, which comprises introducing a nucleotide sequence coding for the tumour-associated mucin peptide to modify the plant viral nucleic acid which codes for the coat protein; infecting plants, plant tissue, plant cells, or protoplasts with the modified viral nucleic acid; and harvesting chimaeric virus particles.

12. A method according to Claim 11, in which the introduced nucleotide sequence is inserted in that part of the plant viral nucleic acid which codes for an exposed region of the coat protein.
- 5 13. A method according to Claim 11, applied to an RNA plant virus, which comprises introducing a DNA coding for the tumour-associated mucin peptide into a cDNA corresponding to the RNA of the plant virus which codes for an exposed portion of its coat protein; inoculating plants, plant tissue, plant cells, or protoplasts with the thus modified cDNA or an RNA transcript thereof, if necessary together with any other DNA or RNA required for multiplication and assembly of whole virus particles in the plant material; and
- 10 harvesting chimaeric virus particles.
14. A method according to Claim 13, in which the modified cDNA is produced by introducing the DNA encoding the mucin peptide into a DNA fragment excised from the plant viral cDNA, and reinserting the modified excised fragment so as to constitute the plant viral cDNA in modified form.
- 15 15. A method according to any of Claims 11 to 14, in which modified virus produced, or RNA extracted therefrom, is passaged in plants to produce further yields of modified virus.
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16. A vaccine comprising chimaeric virus particles according to any of Claims 1 to 10 as an immunogenic component thereof.
17. A vaccine according to Claim 16, further comprising an adjuvant.
- 20 18. A vaccine according to Claim 17, in which the adjuvant is selected from Freund's complete adjuvant, QuilA, QS-21, ISCOM matrix, alum, algammaulin; or combinations thereof.
19. A vaccine according to Claim 16, said vaccine being substantially free from adjuvant.
20. A method of eliciting in an animal, including a mammal, an immune response characterised by the production of serum immunoglobulins specific for mucin peptides or polypeptides,
- 25 which comprises the administration of an immunogenic complex.
21. A chimaeric virus particle according to any of Claims 1 to 10 for use as a vaccine.
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22. The use of a chimaeric virus particle according to any of Claims 1 to 10 in the manufacture of a vaccine for the treatment and/or prevention of tumours and/or cancer.